MULTIMEDIA UNIVERSITY

STUDENT ID NO

SEAT NO

VENUE:_____

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2018/2019

PMT0201 – MATHEMATICS II

(All sections/ Groups)

11 MARCH 2019
2.30 p.m. – 4.30 p.m.
(2 Hours)

Question	Marks
1	/10
2	/10
3	/10
4	/10
5	/10
Total	/50

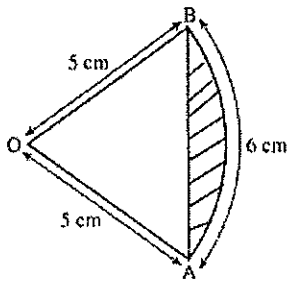
INSTRUCTIONS TO STUDENTS

1. This question paper consists of **ELEVEN** printed pages excluding cover page.
2. Answer **ALL FIVE** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please write all your answers in the **QUESTION BOOKLET**. All necessary working steps **MUST** be shown.

QUESTION 1

(a) Find the exact value of $\sin\left[\cos^{-1}\left(\frac{7}{12}\right)\right]$. Show your working steps. [2 Marks]

(b) The diagram below shows a sector OAB with center O and radius 5 cm.
The length of the arc AB is 6 cm.

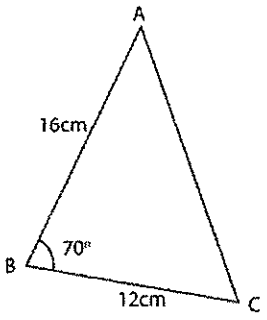


(i) Find the angle AOB in radian. [1 Mark]

(ii) Find the area of the shaded segment. [3 Marks]

Continued...

(c) The diagram below shows a triangle ABC such that $AB = 16$ cm, $BC = 12$ cm, and angle $ABC = 70^0$. Find the length of AC.



[2 Marks]

(d) Determine the amplitude, period and phase shift of the following function:

$$y = -5\cos\left(3x - \frac{\pi}{3}\right)$$

[2 Marks]

Continued...

QUESTION 2

(a) Given $\sin\alpha = \frac{2}{5}$ for $\frac{\pi}{2} < \alpha < \pi$ and $\cos\beta = -\frac{3}{5}$ for $\pi < \beta < \frac{3\pi}{2}$. Find the exact value of $\sin(\alpha + \beta)$. [3 Marks]

Continued...

(b) Prove the identity $\frac{1}{1-\sin x} - \frac{1}{1+\sin x} = 2\sec x \tan x$. [4 Marks]

(c) Given $w = 3(\cos 100^\circ + i \sin 100^\circ)$. Use DeMoivre's Theorem to find w^5 and express your answer in the polar form with $0^\circ < \theta < 360^\circ$. Hence, write w^5 in the standard form $a + bi$. [3 Marks]

Continued...

QUESTION 3

(a) Evaluate the following limits:

(i) $\lim_{x\to 5}\dfrac{x^2-2x+6}{(2x+1)^2}$ [1.5 Marks]

(ii) $\lim_{x\to -2}\dfrac{4x^2+5x-6}{x^2-4}$ [2 Marks]

(iii) $\lim_{x\to \infty}\dfrac{10x^4+3x^2-x+1}{5x-x^3-3x^4}$ [2.5 Marks]

Continued...

(b) Given $f(x)=\begin{cases}3x+4k & \text{if } x\geq 0\\ \sqrt{x+16}+4 & \text{if } x<0\end{cases}$.

(i) Find the value of $\lim_{x\to 0^-} f(x)$. [1 Mark]

(ii) Find the value of $\lim_{x\to 0^+} f(x)$. [1 Mark]

(iii) Find the value of $f(0)$. [1 Mark]

(iv) If the function f is continuous at $x=0$, find the value of k. [1 Mark]

Continued...

QUESTION 4

(a) Find the derivative of $y = 2e^x \ln 2x$ using product rule. [2 Marks]

(b) Find the derivative of $y = \sin(2x+3)$ using chain rule. [3 Marks]

Continued...

(c) Find $\frac{d^2y}{dx^2}$ given $y=(\sin 2x+\cos 2x)^2$. [2.5 Marks]

(d) Given the position function of a particle is $s=\frac{10}{3}t^3-\frac{11}{2}t^2+3t$, determine the time when the velocity of the particle is zero. [2.5 Marks]

Continued...

QUESTION 5

(a) Find the integral of $\int x^2\sqrt{1+x^3}\,dx$ using integration by substitution.

[3.5 Marks]

Continued...

(b) Find the integral of $\int (3x)(\sin 2x)\,dx$ using integration by parts.

[3.5 Marks]

Continued...

(c) Find the integral of $\int \frac{x+3}{(x-2)(x+1)} dx$ using integration by partial fraction.

[3 Marks]

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